



JC I Amplifier
Owner's Guide

THANK YOU!

Congratulations and Thank You for Choosing Parasound

Your new Parasound Halo Series JC 1 mono block power amplifier represents the latest advancements in amplifier technology. The JC 1 was designed by CTC builders and it uses higher quality parts and achieves higher performance than any amplifier we've made since Parasound was founded in 1981. We're proud to offer you this exceptional audio component, knowing that it will bring you many years of enjoyment and dependability.

Here at Parasound, we design our products to perform at a higher level of flexibility and sonic performance than you may have expected. We encourage you to read this entire manual to learn all the features and capabilities of your new JC 1 Amplifier.

If you're eager to get up and running right away, simply follow the basic step-by-step instructions to connect and operate the JC 1. If you want to learn more about the technical and design aspects of your JC 1, refer to the Technically Speaking and Design Overview sections in the back of the manual. If you run into difficulties, the Troubleshooting Chart should help you quickly remedy the problem.

We appreciate you taking the time to read these instructions and thank you for selecting Parasound for your listening pleasure.

The Parasound Staff

Unpacking Your JC 1

Unpack your JC 1 from the shipping carton, remove the enclosed AC power cord, the small "L" shaped metal rack mounts, and the gray control wire with a sub-mini 2.5 mm plug on each end. (This is the trigger connection wire). While you are unpacking your new amplifier, inspect it thoroughly for possible shipping damage. If you see any, contact your Parasound dealer right away. Be sure to save and store both the inner and outer cartons and the packing inserts for possible future transport. To save

room for storage, you can cut the seams on the bottom of the cartons and flatten them.

Keeping Records for Future Reference

Record the serial number located on the bottom of your JC 1 in the space below. Also note your Parasound Dealer's name and phone number. We recommend that you keep your purchase receipt with this manual and store them both in a safe place. You may need to refer to this information sometime in the future.

Parasound JC 1 Amplifier Serial #: _____

Parasound Dealer: _____

Phone Number _____

Date of Purchase: _____

YOU SHOULD KNOW

There is no Parasound warranty for this unit if it was not purchased from an Authorized Parasound Dealer. Investigate any claims of warranty coverage made by unauthorized dealers very carefully as you will need to depend entirely upon the dealer, and NOT upon Parasound. Unauthorized dealers may lack the capability to arrange repairs of Parasound equipment. Authorized Parasound Dealers are listed at www.parasound.com or you can call 415-397-7100 between 8:30 am and 4:30 pm Pacific time.

A missing or tampered serial number could indicate that this unit was stolen or sold by an unauthorized dealer. You should return it to your dealer immediately for replacement or a full refund.

JC 1 Amplifier

PLACEMENT GUIDELINES FOR YOUR JC 1	1
CONNECTING A STEREO PREAMPLIFIER OR A SURROUND CONTROLLER TO THE BALANCED INPUT ON YOUR JC 1	2
CONNECTING A STEREO PREAMPLIFIER OR A SURROUND CONTROLLER TO THE UNBALANCED INPUT ON YOUR JC 1	3
CONNECTING A SPEAKER TO YOUR JC 1	4
MANUAL AND AUTOMATIC TURN ON-OFF OPTIONS	5
CONNECTING AN EXTERNAL DC SOURCE FOR AUTOMATIC TURN ON-OFF	6
CONNECTING THE JC 1 TO TRIGGER ANOTHER COMPONENT	7
UNDERSTANDING THE INDICATORS ON THE JC 1	8
CONNECTING THE AC POWER CORD	9
MAINTAINING YOUR JC 1	10
TROUBLESHOOTING GUIDE	11
SERVICING YOUR JC 1	12
TECHNICALLY SPEAKING	13
PARASOUND JC 1 DESIGN OVERVIEW	15
PARASOUND JC 1 SPECIFICATIONS	17

Power amplifiers are usually heavier and generate more heat than other components. To avoid damage to the JC 1 or other equipment and to reduce risk of fire, you must follow these guidelines:

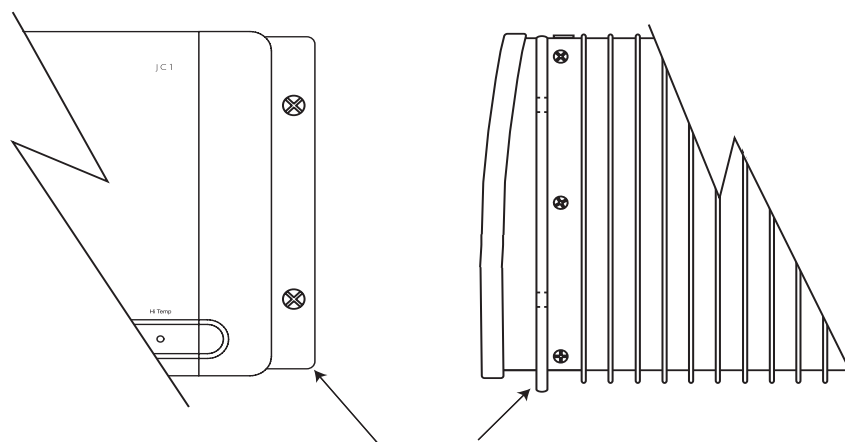
- Place the JC 1 on a separate shelf that will adequately support its weight.
- Keep it away from heat sources such as air ducts or radiators.
- Avoid placing it on carpeting or another material that might obstruct airflow into the openings in the chassis bottom.
- Leave at least 3" of space around both sides and 6" of space above the top. The bottom clearance can be a little less.
- Do not block the front of the JC 1 behind closed cabinet doors during use.
- Do not stack the JC 1 with other components inside a cabinet unless you use a fan to circulate and exhaust the warm air that builds up between them.

Rack Mounting Your Parasound JC 1

To mount the JC 1 into a 19" wide equipment rack, you must first attach its Rack Mount Adapters (provided). With its four feet removed, the JC 1 chassis and front panel height occupies four rack spaces (7" or 176 mm). When mounting equipment below the JC 1, you will also need to allow about 1/8" below the unit for the bottom chassis screws.

To attach the rack mount adaptors

- Remove the three shiny screws from each side of the JC 1. These are arranged vertically, behind its front panel and in front of its first heatsink fin.
- The angled part of the brackets that attaches to the rack should be just behind the front panel.
- Line up the holes on each rack mount adaptor with the holes on the unit and reinsert the three screws.
- Make sure the screws holding the rack mounts are tight because they will support the entire weight of the JC 1 when it's installed into the equipment rack.



Rack Adapter Mounted on JC 1

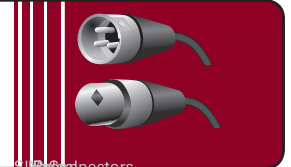
A single standard rack space allows 1-3/4" vertical inches in a 19-inch wide equipment rack. This measurement standard was developed by the EIA (Electronic Industries Association) so manufacturers of electronic components and equipment racks could build products in standardized heights that would fit in a uniform space. Please call your Parasound dealer or Parasound Technical Services if you need additional advice about rack mounting the JC 1.

Balanced Input Jack

Balanced connections will give you the best sound in most instances. If your preamplifier or surround controller has balanced XLR output jacks, we recommend that you use them. Refer to the *Balanced and Unbalanced Lines* in the *Technically Speaking* section for additional information about why we recommend using balanced lines.

What You'll Need:

- One balanced interconnect cable with XLR connectors
- A preamplifier or surround controller with balanced outputs

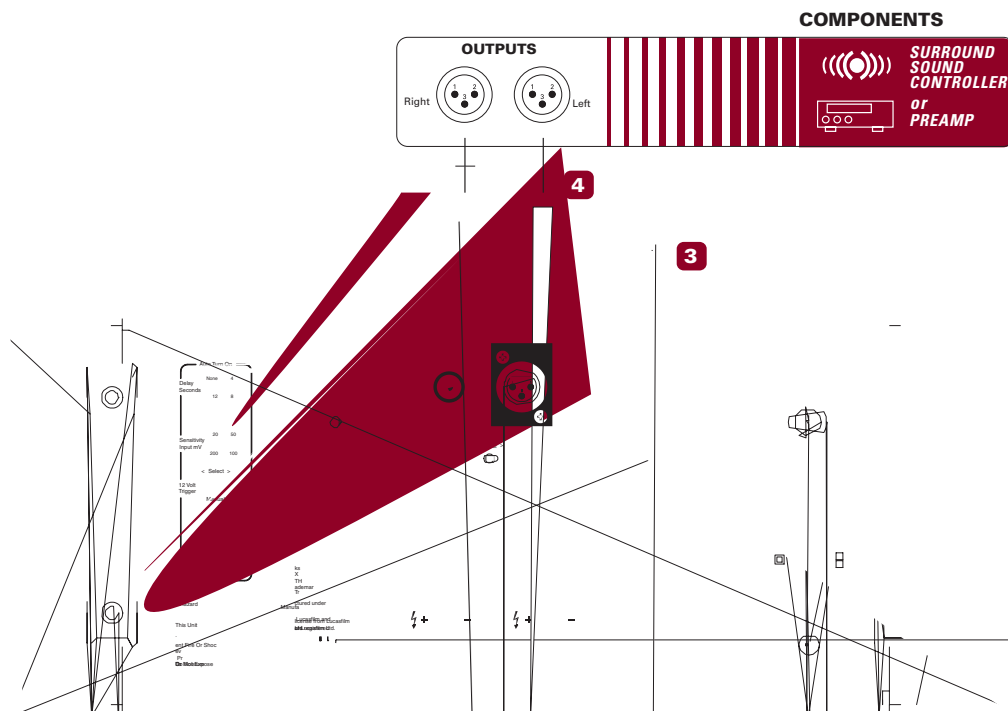


Before Connecting

- Leave the JC 1's AC cord disconnected until you have made all other connections to prevent any surprise burst of sound.
- Make sure that all your cables are long enough so they are not strained or stretched once they are connected.
- Make sure the *Select* switch on the JC 1 is in its *Balanced Input* (right) position.

To Connect

- 1** Plug the male end of the balanced interconnect cable into the *Balanced Input* jack on the JC 1.
- 2** Plug the female end of this cable into the desired channel balanced output jack on your preamplifier or surround controller.
- 3&4** Repeat steps 1 and 2 above to connect additional JC 1s to other controller channels.



YOU SHOULD KNOW

Balanced XLR Jacks and Their Pin Configuration

The balanced input on the JC 1 uses an XLR jack that conforms to the industry standard of: Pin 1: Ground, Pin 2: Positive (+), Pin 3: Negative (--). The balanced outputs on some components use terminals with 3 screws instead of XLR jacks. These are compatible with the JC 1 as long as you match the bare wires to the corresponding pins on the XLR plug: + to pin 2, - to pin 3, and Ground to pin 1.

CONNECTING A PREAMPLIFIER OR A SURROUND CONTROLLER TO THE UNBALANCED INPUT ON YOUR JC 1

1

2

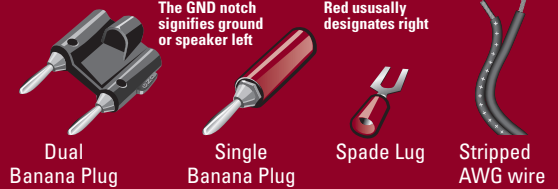
Speaker Terminals

The two five-way binding post speaker terminals on the JC 1 are connected in parallel and accept most speaker wire terminations including single or dual banana plugs or 1/4" spade lugs. The openings in the terminals are too small to accommodate bare ends of the gauge speaker wire you should use.

What You'll Need:

- Speaker wire (AWG 16 or thicker) with banana plugs or spade lugs. Stripped bare ends won't fit terminals.
- A Loudspeaker

Common Speaker Connectors

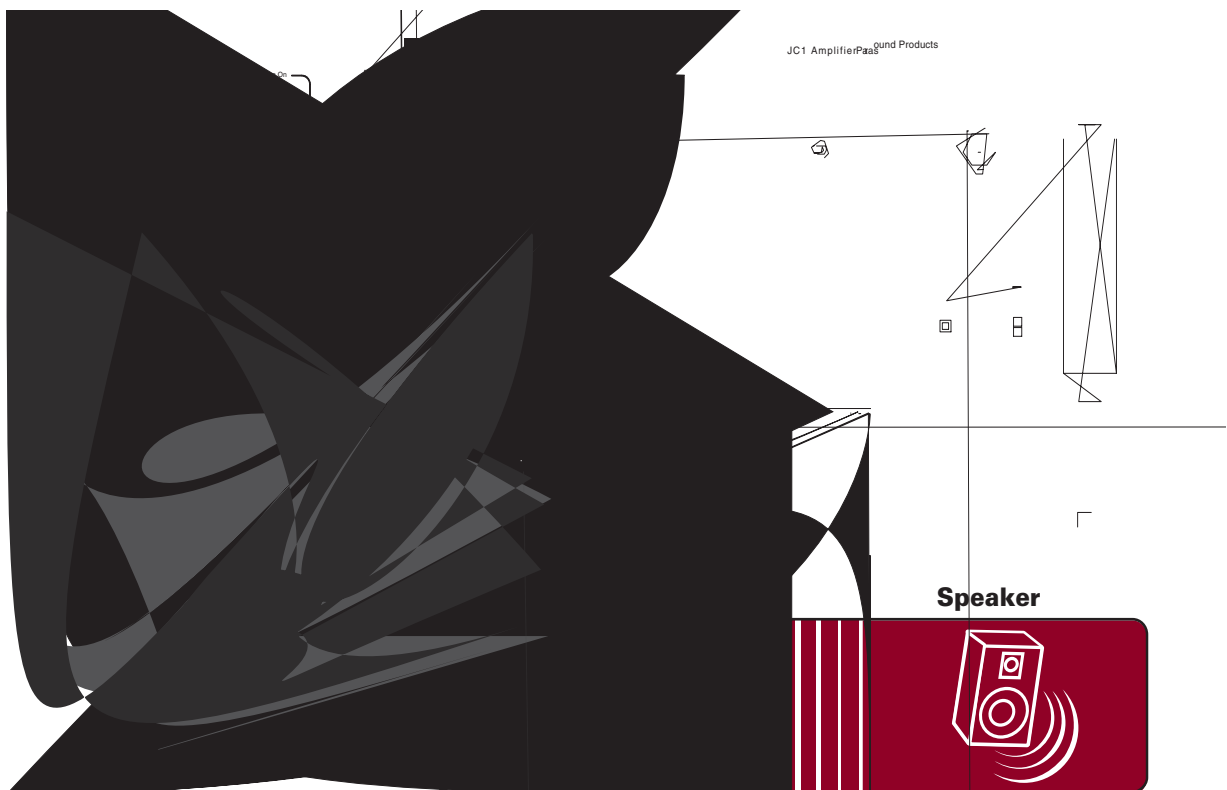


Before Connecting

- Remove power to all the components in your audio system.

To Connect

- 1 Connect the wire with the ridge or other marking to either red + (positive) speaker terminal on the JC 1. Connect the wire without the ridge or other marking to the corresponding black -- (negative) speaker terminal on the JC 1.
- 2 Insert the other end of the wire with the ridge or other marking into the red + (positive) terminal on the speaker. Insert the wire without the ridge or other marking into the black -- (negative) terminal on the speaker.
- 3&4 Repeat steps 1 and 2 with the other JC 1 speaker terminal to bi-wire your speaker.



YOU SHOULD KNOW

Correct Speaker Polarity is Important

Polarity refers to the + and - connections. Speaker wires are coded with printing or a ridge on the insulation on one of the leads so you know which lead was connected to the + and - terminals at the other end. This coding will help you keep the + and - polarity consistent for all channels. Refer to *Speaker Polarity* in the *Technically Speaking* section for additional information.

The JC 1 can be turned on and off manually or automatically for your convenience.

Using the Front Panel On-Off Button

For manual operation, the JC 1 rear panel *Auto Turn On* switch must be in its *Manual* (middle) position.

Connecting an Active Audio Source for Automatic Turn On-Off

The JC 1 can be turned on and off with an audio signal, or by an external trigger voltage. You can also adjust how long the JC 1 delays its actual turn on after it's been triggered.

Audio for Automatic Turn On-Off

To automatically turn on the JC 1 whenever music is playing (an audio signal is present), select the Audio trigger by moving the *Auto Turn On* switch right to its *Audio Signal* position. Refer to *Audio Trigger Sensitivity Adjustment* in *Technically Speaking* for more information about adjusting the level of audio required to turn the JC 1.

What You'll need:

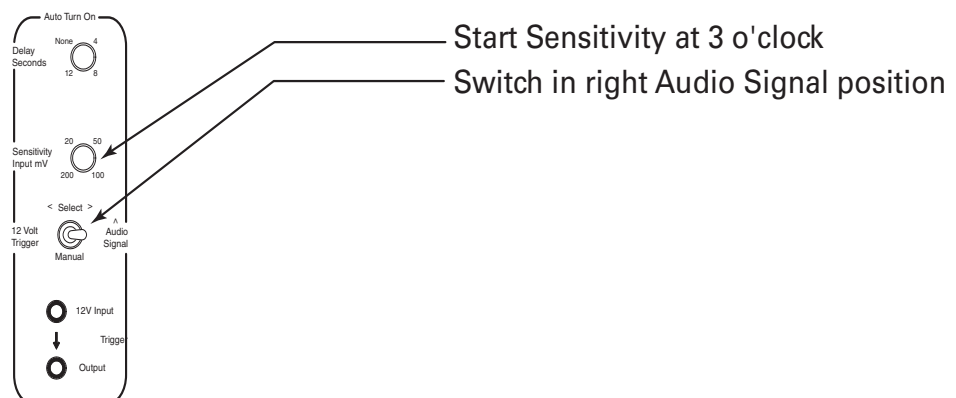
An active audio source connected to the *Balanced* or *Unbalanced Input* jack on the JC 1

Before Connecting

- Remove power to all the components in your audio system.
- Make sure the *Auto Turn On* switch on the JC 1 is in its *Audio Signal* (right) position.
- Set the Audio triggering *Sensitivity* adjustment knob on the rear panel to the desired level. Start with the 3 o'clock detent (click stop) position.

To Connect

Connect an active audio source to either the *Balanced* or *Unbalanced Input* jack. (Refer to pages 2 and 3)



YOU SHOULD KNOW

Turn Off Delay in the Audio Mode

When the music (audio signal) stops, the JC 1 will remain turned on for about five minutes. This delay prevents unwanted turn-off during silent passages in music or pauses between tracks.

If you want to automatically turn on the JC 1 with an external DC voltage, select the DC trigger by moving the *Auto Turn On* switch on the rear panel left to its *12 Volt Trigger* position.

What you'll need:

A wire with a 2.5 mm sub-mini plug on each end (provided)

A "control" component with +9Vdc to +12 Vdc trigger voltage

Before Connecting

Remove power to all the components in your audio system.

Make sure the *Auto Turn On* switch on the rear panel is in its *12 Volt Trigger*

CONNECTING THE JC 1 TO TRIGGER ANOTHER COMPONENT

Whenever the JC 1 is turned on either manually or automatically, it generates 12 Vdc at its 12 V Trigger Out jack so it can trigger additional JC 1 amplifiers or other components on and off.

What You'll Need:

A second wire with a 2.5 mm sub-mini plug on each end (not provided)

A component that can be triggered with an external +9 Vdc to +12 Vdc source.

(The JC 1 DC Trigger output provides up to 150 mA of current.)



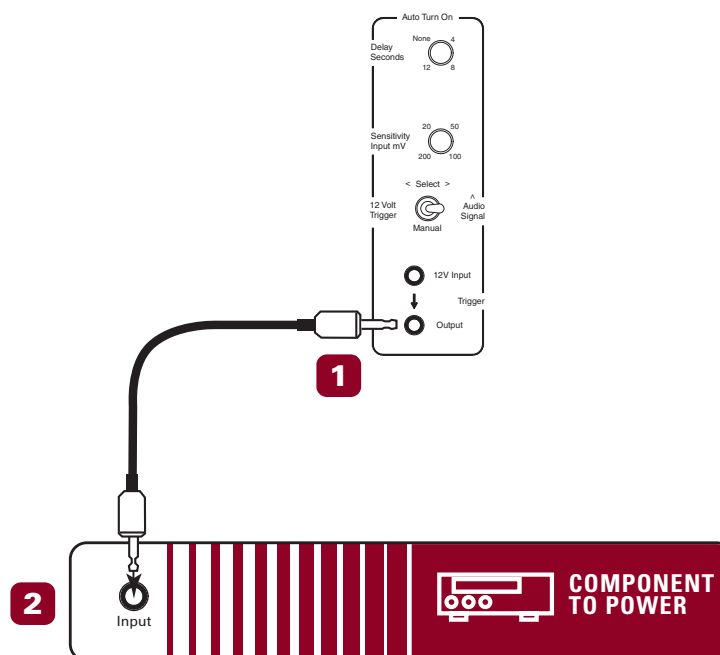
2.5 mm sub-mini plug

Before Connecting

- Remove power to all the components in your audio system.

To Connect

- 1** Plug one end of this trigger wire into the **12 V Output** jack on the JC 1
- 2** Plug the other end of this wire into the component that you want the JC 1 to trigger.



Automatic Turn On Delay Time

You can delay the JC 1 turn on time so it doesn't turn on at the same instant as your other components (or other JC 1s). This avoids turn-on surges and brownouts that might cause units with microprocessors to lock up, or even trip house wiring circuit breakers. If you're lucky enough to own more than one JC 1, select a different delay time for each unit. Turn the Delay knob for the desired delay time from None (fully counterclockwise) to 12 Seconds (fully clockwise).

YOU SHOULD KNOW

If the device use your JC 1 controls doesn't have a 2.5 mm trigger output connector, you can cut one plug off the trigger wire and terminate the end as required. The lead with the stripe is positive and the lead without the stripe is negative.

A AC Present Indication

When the JC 1 is plugged into a live AC outlet, a soft blue halo glows behind its *On-Off* button and its red "P" Badge glows faintly. These indicate that the JC 1 is plugged into a live AC outlet, even when it is turned off.

B On and Off Indications for Both Manual and Automatic Modes

When the JC 1 is first turned on, the soft blue glow behind its *On-Off* button turns red for about five seconds and then becomes a brighter blue.

C High-Temp Indicator

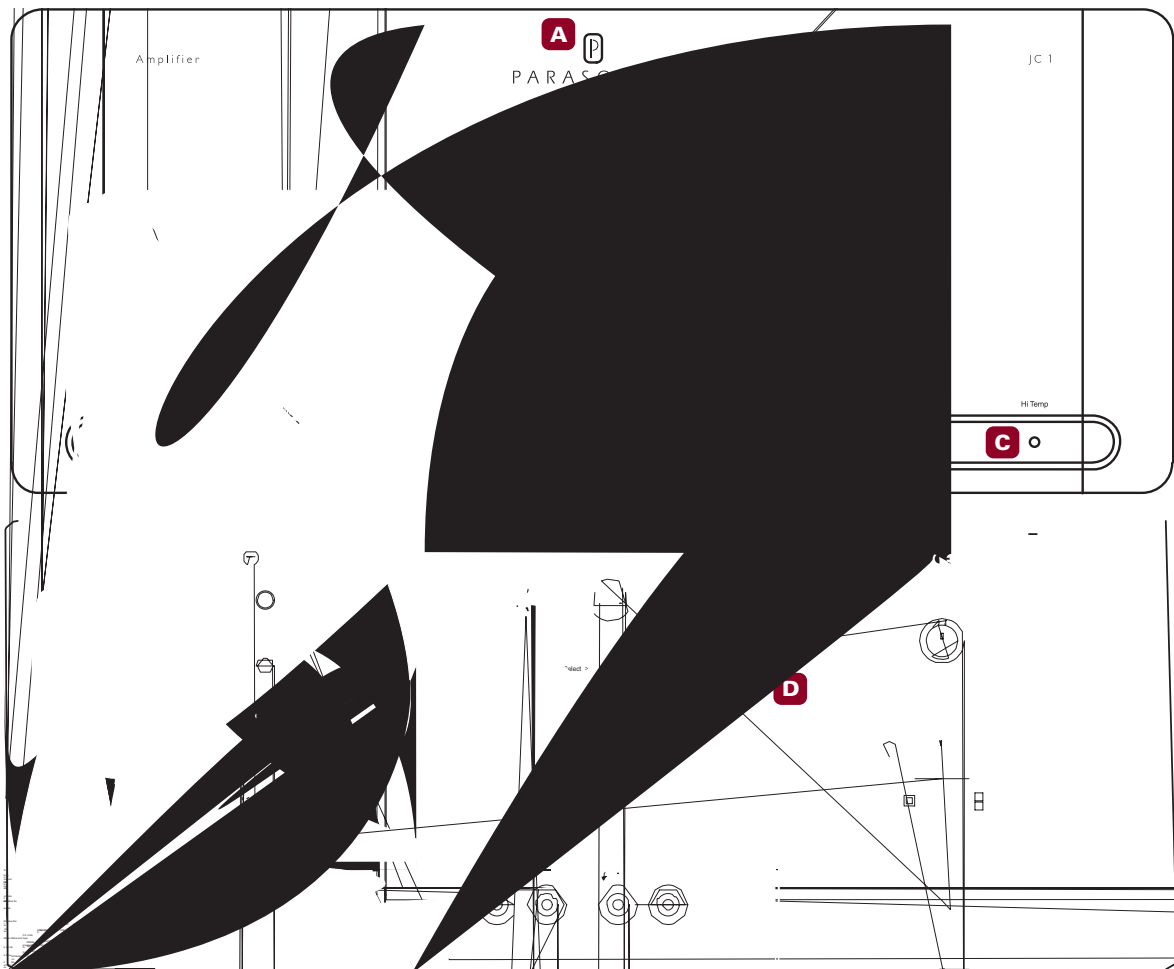
This indicator is near the right side of the panel recess. It will glow red if the JC 1 overheats.

D Ground Switch

The *Ground* switch can assist in reducing audible hum caused by ground loops in your system. Leave this switch in its *Normal* (right) position unless you hear hum through your speakers (you'll only be able to hear this hum after your entire system is installed and operating). You can try the *Lift* (left) position to eliminate it. Refer to the Technically Speaking section for detailed technical information about the causes of ground loops and what you can do about them.

E Bias Level Switch

The *Bias Level* switch offers two bias setting for the output transistors. In its *Low* (left) position, extremely generous bias idle current and class A operation make crossover and higher-order odd harmonic distortion inaudible. In its *High* (right) switch position, bias idle current is increased to perfectly match the characteristics of the JC 1s output devices. This all but banishes these distortions. With its *Bias Level* switch set to *High*, the JC 1 will run quite warm and consume more AC power when it is idling or playing at low listening levels. If your JC 1 is VERY well ventilated, you may find the high bias offers a sonic improvement. If your JC 1 is mounted in a cabinet, or ventilation is restricted in any way, we recommend you leave the *Bias Level* Switch in its *Low* position.



AC Power Connections

We recommend that you plug your JC 1 into the same AC wall outlet or power strip that powers your other audio components, especially the preamplifier or system controller. Having all the audio components on the same power circuit helps prevent hum caused by possible ground loops. The JC 1 requires AC power that is continuous rather than switched on and off.

What you'll need:

An IEC 65 AC Cord (provided)

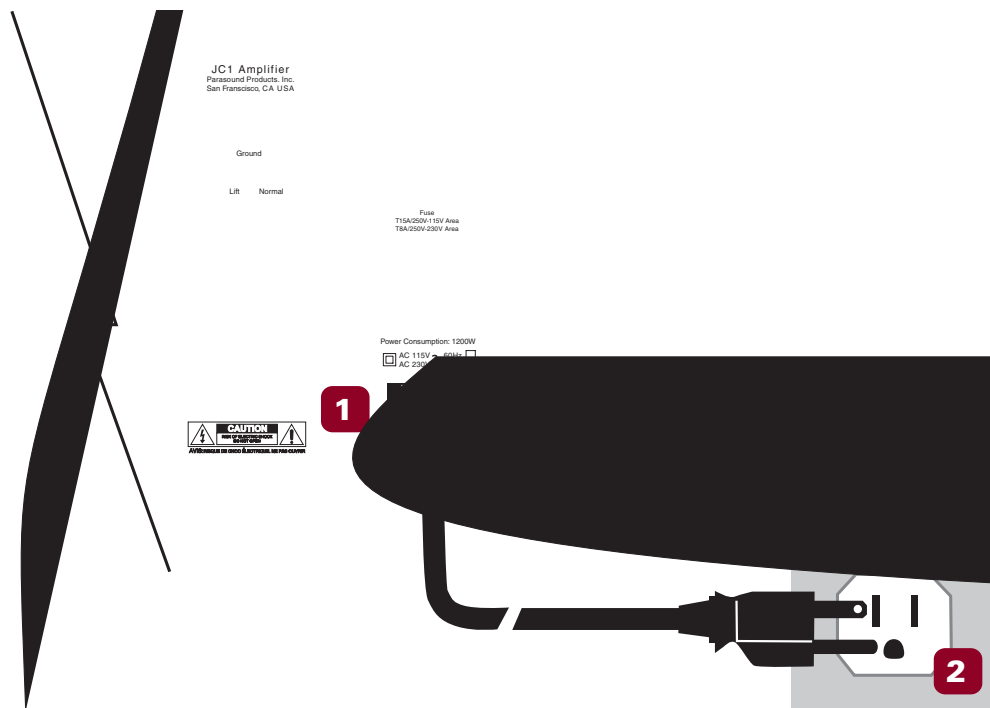
An AC outlet or high quality AC power strip within reach of the AC cord

Before Connecting

- Remove power to all the components in your audio system.

To Connect

- 1 Plug the female end of the AC cord to the AC receptacle on the rear of the JC 1.
- 2 Plug the male end of the AC cord to an AC outlet or power strip.



Your Parasound JC 1 power amplifier requires no periodic maintenance and has no user-serviceable parts inside. To avoid the risk of electric shock, do not remove its top cover. The amplifier's exterior can easily be cleaned with a soft cloth pre-moistened only with a few drops of water or glass cleaner.

Main Power Fuse

If this fuse blows, please contact Parasound Technical Service for further advice.

Notes:

	PROBABLE CAUSE	REMEDY
	Power cord is disconnected	
		Check polarity of DC source with a voltmeter Try connecting a 9 V battery to the 12V DC input
JC 1 will not turn off when audio signal is removed		Make sure Auto On
Hum and / or buzz through speakers	Ground loop between preamplifier and JC 1 or at the equipment rack	Move the Ground Lift switch to its Lift position
		Install nylon shoulder washers on both sides of the panels of all equipment to insulate metal from touching the rack

If All Else Fails-Call Us for Help

Call your Parasound dealer or Parasound's Technical Service Department toll free at 1-866-770-TECH (8324) between 8am and 4pm Pacific Time. We can often solve the problem with simple diagnostic tests you can perform yourself. If we determine that your JC 1 will need further inspection or servicing, we will:

- a) refer you to an authorized Parasound repair center near you, or
- b) authorize return of the unit to us and advise you of the correct procedure.

Procedure for Returning Your JC 1 to Parasound for Service

If Parasound determines that you should send your JC 1 to Parasound, you will be given a Return Authorization (RA) number. This RA number must be clearly marked on the outer carton only. IMPORTANT: Enclose a copy of your original purchase receipt. A unit is eligible for warranty repair ONLY when the purchase receipt shows that the unit was purchased from an Authorized Parasound Dealer. A unit obtained through unauthorized channels is not eligible for warranty repair. Parasound is not responsible for any sellers' misrepresentations about our warranties or other service policies.

We do not accept any of the following:

Units with collect shipping charges

Units without a valid RA number

Units without a suitable shipping carton

Aut A u o pC *Units for which we see or hear evidence of improper packing*

For a non-warranty repair, contact us for an estimate of the repair charges before you ship the unit to us. The same packing and Return Authorization number procedures apply.

Important Notice - Shipping the JC 1

Before shipping the unit to Parasound, you MUST re-pack the unit into its fitted molded foam insert sandwich and its original carton. If you do not have the original packing cartons and foam inserts, call us for new packing materials that we can provide to you for a nominal charge. Use of any other carton and packing materials will probably result in shipping damage, and refusal of the unit. Common carriers such as UPS seldom pay claims for damage incurred during shipment when a product is surrounded only with Styrofoam "peanuts" or otherwise improperly packed. We cannot stress enough the importance of properly packing your JC 1. Shipping damage resulting from inadequate packing can cost you a lot of money and significantly increase the time required for repair. Ship the unit with adequate insurance. After repair under warranty, the unit will be returned to you via prepaid UPS within the continental United States.

Audio Trigger Sensitivity Adjustment

The Auto Turn On Audio Sensitivity Control sets the threshold of the audio trigger signal. You can adjust this level from a maximum sensitivity of 50 mV (fully counterclockwise) to a minimum sensitivity of 250 mV (fully clockwise). If you set this control to 50 mV, the JC 1 might be falsely triggered on by non-musical or noisy signals that can appear in the system, such as when you switch preamp inputs at high volume levels. If you set this control to 250 mV, the JC 1 might not turn on during quiet musical passages. The detented position (click stop) at 3 o'clock is a good starting point and will be suitable in most systems.

Balanced and Unbalanced Input Lines

Recording and broadcast studios use balanced connections exclusively because of their inherent ability to reject noise and hum, thus assuring the best sound. Certain high quality preamplifiers and surround controllers built for residential use utilize balanced connections with XLR jacks for the same reasons. All Parasound Halo Series power amplifiers have balanced inputs with XLR jacks so you can take full advantage of their inherent noise reduction capability and superior sound quality.

Unbalanced connections with RCA jacks are found on all home audio equipment. RCA jacks and two-conductor wires are less costly than the additional circuitry, higher priced XLR connectors and three-conductor wiring required for balanced connections.

In an unbalanced line, the positive audio signal appears at the center pin of the RCA jack and the negative signal on the outer shield wire, which also functions as the ground connection. Unbalanced interconnect cables are vulnerable to hum from an AC line, or other noise, such as RF (Radio Frequency), which can be reproduced through your loudspeakers. Since the unbalanced line's ground also carries the audio signal, there is no way for the connected amplifier or preamplifier to distinguish between the audio signals you want and unwanted noise emanating from external sources.

Balanced lines are superior because they utilize separate conductors for audio and ground: two inner conductors carry the positive and negative audio signal, and a third outer wire connects the grounds and also shields the two signal conductors. When the positive and negative signals appear at the component receiving the signal they are equal, but 180 degrees out of phase with each other with respect to ground. To send and receive balanced signals requires special differential circuitry.

A differential input circuit amplifies only the difference between the positive and negative signals. For example, when a 1 Volt signal arrives at a balanced input stage,

the differential input "sees" a positive 1 Volt minus a negative 1 Volt, or 2 Volts total. External hum and noise that somehow gets into a balanced line is common to both its positive and negative conductors with respect to ground. Therefore, it is canceled or rejected by the differential input circuit.

This phenomenon of rejecting noise signals common to both positive and negative conductors is called common-mode rejection. Differential inputs are specified according to how well they reject signals common to both conductors. This is measured in dB and is called the common mode rejection ratio or CMRR.

Choosing Interconnect Cables and Speaker Wire

We are often asked to recommend specific brands of interconnect cables and speaker wire. It's true that with some amplifiers, sound quality will vary greatly according to interconnect cables and speaker wires. However, Parasound amplifiers use robust circuitry that sounds superb regardless of interconnects and speaker wires. Therefore, we feel that choosing a brand of cable for Parasound amplifiers is largely a matter of personal taste.

Signal Polarity

The JC 1 does not invert polarity. Therefore, if you know that your preamplifier or surround controller inverts polarity, you may connect your speaker + and - opposite of the above instructions to reverse polarity. This applies to all speakers in your system driven by amplifiers that don't invert polarity. Contact the maker of your preamplifier or surround controller to verify its polarity if this is not mentioned in its owner's manual.

Speaker Wire Length and Gauge (thickness)

When selecting speaker wire, follow these guidelines:

- Keep the length of your speaker wire as short as possible
- Use the thickest wire practical. For lengths greater than 50 feet, use speaker wire with an AWG (gauge) of 14 or lower. The smaller the AWG, the thicker the wire.
- Do not use speaker wire that is thinner than 16 AWG.
- Use the same length of speaker wire between each JC 1 amplifier and speaker, regardless of the actual distance between them.

Eliminating Ground Loops - Hum and Buzz

Audible hum and buzzing noises in a system are usually related to issues with the component grounds. Ground (sometimes called common) is a point of reference for voltages in virtually all audio and video components. Ground is supposed to remain at zero volts while the audio signal swings positive (voltage above ground) and negative (voltage below ground). If ground isn't at zero, there can be an audible 60 Hz hum (or 50 Hz hum in regions with 50 Hz AC). The harmonics of these frequencies (120 Hz, 240 Hz, 480 Hz or 100 Hz, 200 Hz, 400 Hz) may add buzz in addition to the hum.

The ideal of zero voltage ground for all the components in a system is practically impossible, because some resistance between the ground points of different components is inevitable. By keeping components close together with their power cords plugged into a common AC outlet or power strip, you'll avoid the problems created by resistance in the house's wiring.

Hum and buzz is also caused when unwanted voltage flows through multiple component ground points called ground loops. Here are three tips to avoid ground loops:

1. Use a balanced input line with your Parasound JC 1. (See Balanced and Unbalanced Lines in this section).
2. When rack mounting, always use the included insulated "shoulder" washers. These break the ground loops caused by metal-to-metal contact between the rack, the units, and their rack-mount bolts. Extras are available from rack manufacturer Middle Atlantic Products, www.middleatlantic.com.
3. Use the Ground switch on the JC 1 to eliminate most ground loops. This separates the JC 1's signal input ground from its chassis ground to isolate unwanted voltage in the ground shield of the unbalanced (RCA) input cable. Be sure your system installation is finished before you try moving the Ground Lift switch from its "Normal" to its "Lift" position.

Level Control - Omitted by Design

There is no level (gain) control on the JC 1 to avoid compromising the audio signal. We expect you'll be using a preamplifier or surround controller with a high quality volume control and S/N ratio.

Two Sets of Binding Posts

The JC 1 is equipped with a second set of binding posts to facilitate bi-wiring. This feature enables you to "bi wire," or connect two lengths of speaker cables to the same speaker for improved performance. Refer to the owner's manual of your loudspeaker to determine if the manufacturer recommends bi-wiring.

Designed by John Curl and CTC Builders

Parasound has worked with legendary designer John Curl since 1989. John has been a legend among audiophiles and electronic engineers since the mid '70s. He pioneered measurements to correlate musical accuracy with the materials used in component parts, worked with world-class touring companies, and has designed highly coveted audio classics. These designs include the original Mark Levinson JC-2, Denneson JC-80, Vendetta Phono Preamplifier, master recorders for Wilson Audio and Mobile Fidelity; and the mixing consoles used in live concerts by The Grateful Dead and at the Montreux Jazz Festival in Switzerland.

In 2000 John formed CTC Builders to develop totally uncompromised analog products. CTC's products have earned the utmost respect from the most discerning audiophiles and high end magazine reviewers.

The Power Supply

The heart of the power supply is a 10 Ampere (continuous!) toroid transformer, chosen for its efficiency, low hum field, and high power rating. Encapsulating this massive power transformer in an epoxy-filled steel canister assures ultra-quiet performance.

To create the high voltage B+ and B- supply rails for the output stage, we use high-speed, fast-recovery rectifier diodes and four enormous 33,000 uF Nichicon "GoldTune" series electrolytic filter capacitors, chosen for their low Equivalent Series Resistance (ESR) and dielectric absorption. In addition, these filter capacitors are bypassed with smaller polypropylene capacitors to reduce AC ripple in the DC supply and to further eliminate noise and interference that is generated in AC power lines from computers and other appliances in the home.

Relay-Bypassed Soft Start Circuit

When the JC 1 is first turned on, there is a significant amount of in-rush current to required to charge up the enormous power supply capacitors. In order to suppress this in-rush current and keep nuisance tripping of circuit breakers, we employ NTC (negative temperature coefficient) resistors. These resistors cut the in-rush current by about 50%. Once they heat up, they essentially become a jumper with zero ohms resistance. However, the JC 1 goes one step further for this circuit. After the NTC resistors have done their job of suppressing in-rush current a gold contact relay automatically is activated to jump across the NTC resistors to completely bypass them. This extra step insures that the resistors do not restrict any current whatsoever to the power supply once the JC 1 is in full operation.

Complementary Configuration

Each stage of amplification has transistors fed by the positive DC power supply and complementary transistors fed by the negative DC power supply. Thus, half of the devices amplify the positive half of the musical waveform while the other half of the devices amplify the negative half. This complementary topology is inherently linear, and reduces distortion and improves sonic accuracy.

The Input Stage

The JC 1's input stage uses matched pairs of discrete JFETs arranged in a differential configuration. JFETs are ideal for the input stage because their inherently high impedance is unaffected by the impedance of source components. Differential configuration provides superior noise reduction. These precision input JFETs are also cascoded to produce the current necessary to drive the MOSFET drivers in the following stage.

The Driver Stage

The driver stage provides critical amplification for which we employ complementary matched pairs of MOSFETs selected for their tube-like sonic qualities. MOSFETs tend to generate less odd-order harmonic distortion than bipolar transistors. This is important because odd-order distortion sounds unnatural and fatiguing to the human ear, whereas even-order distortion is less offensive because it is consonant, rather than dissonant. Our MOSFET driver stage prevents the harshness and brittle sound so often found in other amplifiers.

The B+ and B- power for our input and driver stage cannot sag under load because it is supplied by independent transformer secondary windings with independent rectification, filtering, and voltage regulation. This preserves soundstage width and depth even when the JC 1 output stage is drawing enormous current.

The Output Stage

The amplifier's sonic characteristics are established by its input and driver stages. Now, the sole job of its output stage is to deliver the enormous current and voltage from its power supply to the speakers. Bipolar output transistors are better than MOSFETs in the output stage because of their higher safe operating area (SOA) and inherent ruggedness. The JC 1's output stage employs nine pairs of high current (15-ampere) bipolar transistors to insure long-term reliability, even with continuous high power operation and challenging speaker loads. Lightning-fast (60 MHz) transistors respond instantly to complex demands in the musical signal, virtually eliminating distortions that occur with slower transistors. Slew rate limiting and Transient Intermodulation Distortion (TIM) are simply not an issue in the JC 1.

Class A/AB Operation

Pure class A operation provides the purest sound. However, an amplifier operating entirely in class A operation would be enormous, highly inefficient, and generate far too much heat. Class AB combines some of the advantages of Class A with the efficiency of Class B operation. It is a compromise that reduces the heat generated in pure class A operation and the odd-order harmonic distortion created in class B. In class AB, the driver and output stages are always turned on, which provides a nominal amount of pure class A operation. At higher power levels, when the musical waveform swings from positive to negative and vice versa, each bank of transistors is allowed to rest momentarily. This resting, or quiescent time, makes it possible to deliver high amounts of power without overheating. It also makes it possible to use passive cooling and avoid fans, whose noise can be heard over the music. The JC 1 input and driver stages are always on for 100% pure Class A while its output stage provides up to 25 watts of pure Class A - more than amplifiers selling for three or four times its price. The result is less fatiguing, more natural sound at a refreshing price.

Total Protection - DC Servos

Direct Current (DC) burns out speakers. Therefore, every power amplifier must have some way to insure that DC from its power supply never reaches its + or - speaker terminals. Most amplifiers simply use trim controls to reduce their DC offset or capacitors to block DC. Unfortunately, trim controls can allow DC offset to increase over time, and even the most expensive capacitors in the audio signal path will "veil" sonic clarity and attenuate bass response.

Parasound power amplifiers incorporate ingenious and fast-acting DC servo circuits, which completely eliminate the need for coupling and blocking capacitors. The JC 1 is direct-coupled from its input jack to its speaker terminals. This advanced circuitry never needs adjustment or maintenance. It operates outside the audio signal path to keep the DC offset at the output of the JC 1 at a constant 0.00 Vdc. The results are startling clarity, freedom from listening fatigue, and formidable bass response.

Total Protection - Relays

The JC 1 has a high-quality protection relay with gold-plated contacts for long-term reliability. This relay functions to protect either the amplifier, the speaker, or both. When the JC 1 is first powered on, the relay remains open for three seconds as the positive and negative power supplies stabilize and reach equilibrium. This prevents annoying popping or other transient noises. Relay protection also prevents speaker damage in case of a catastrophic amplifier failure. Any amplifier that doesn't use relay protection for its speaker outputs compromises the safety of the amplifier and your speakers.

Total Protection - Current Overload

Specialized current-sensing transistors are connected to the output stage of the JC 1 to constantly monitor the current flow through the output transistors. If the current drawn by this stage exceeds a predetermined safe level due to a load impedance below 1 ohm or a short circuit at the speaker terminals, the output relay will open immediately to prevent the output transistors or other parts from failing.

Total Protection - Fuses

The JC 1 has separate fuses for its positive and negative DC voltage rails. These fuses provide backup protection in case the over-current protection does not work in time, or if an internal part fails. In the event of a part failure, these fuses halt operation to minimize damage to additional parts.

Chassis

The JC 1 chassis is heavy gauge steel with an aluminum rear panel where its critical input circuit board mounts. Aluminum is non-magnetic and cannot be energized by nearby high voltage and current flow, thereby removing a potential cause of "smearing" or other audible intrusions.

Power Output. 20 Hz - 20 kHz

400 watts continuous, 8 Ω
800 watts continuous, 4 Ω

Class A Power Output

25 watts, bias set to High
10 watts, bias set to Low

Current Capacity

135 amperes peak

Slew Rate

> 130 volts per microsecond

Frequency Response

2 Hz - 120 kHz, +0/-2 dB

Total Harmonic Distortion

< 0.15 % at full power
< 0.018 % at typical levels

IM Distortion

< 0.03 %

TIM

Unmeasurable

Dynamic Headroom

> 1.8 dB

Input Impedance

Balanced: 100 k Ω
Unbalanced: 50 k Ω

Input Sensitivity for 28.28 V Output into 8 Ω

Balanced: 1 V per leg
Unbalanced: 1 V

Signal-to-Noise Ratio, input shorted

> 122 dB, IHF A-weighted, bias set to Low
> 120 dB, IHF A-weighted, bias set to High
> 113 dB, Unweighted, bias set to Low
> 111 dB, Unweighted, bias set to High

Damping Factor

> 1200 at 20 Hz

Auto On DC Trigger Requirements

+9 Vdc to +12 Vdc, 2 mA

Auto On Audio Trigger Threshold

50 - 250 mV AC

Dimensions

Width: 17-1/2" (445 mm)
Panel height: 7" (178 mm)
Height with feet: 7-5/8" (194 mm)
Depth: 19-1/8" (485 mm)

Power Requirement

Standby: 25 watts
Idle: 250 watts
Full Power into 8 Ω : 1280 watts

Net Weight

64 lb. (29.1 kg)

Shipping Weight

78 lb. (35.5 kg)

Features and specifications subject to change without notice.

© Parasound Products, Inc., 2002.
v 1.1





PARASOUND

Parasound Products, Inc. 950 Battery Street, San Francisco, CA 94111
415-397-7100 / Fax 415-397-0144 www.parasound.com